
Space Weather Forecast

Issued on Thursday, 20 January 2022 at 12:46 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Slight chance G1/Minor Storm intervals from CME arrivals throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: There are five numbered sunspots containing active regions on the Earth-facing disc. Solar activity reached Moderate levels as AR2929, approaching the western limb, produced an M5 flare at 20/0601 UTC. An associated CME followed soon after, with a filament eruption from the southwest quarter, around 20/0800-0830 UTC, also producing a CME. Both CMEs are awaiting model analysis.

The remaining spots groups showed little activity, or changes in complexity. AR2930 is the next largest, and modestly complex group, which is also approaching the west limb, and lies to the north of AR2929. AR2927 and AR2933 are small regions, lying the southwest quadrant. Newly numbered region AR2934, is a single uni-polar spot, and continues to rotate into the southeast quadrant from the southeast limb.

Solar Wind / Geomagnetic Activity: The solar wind, as measured by DSCOVR and ACE at L1 decreased from 630 km/s to 480 km/s. The total magnetic field strength was weak, with the important north-south component weakly variable. Geomagnetic activity was Quiet to Unsettled (Kp 0-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) increased following the M5 flare with the S1/Minor solar radiation storm level being exceeded around 20/0800UTC, with a current peak of around 23pfu and on ongoing S1 radiation storm.

Four-Day Space Weather Forecast Summary

Solar Activity: There continues to be a slight chance of further isolated Moderate flares as AR2929 rotates around the west limb, however this risk should diminish through the period, barring any new sunspot development elsewhere on the visible disc.

Solar Wind / Geomagnetic Activity: There are three potential CME arrivals through the period, along with the two CMEs produced this morning UTC being analysed at present.

There is a slight and diminishing chance of a glancing impact early day 1 (20th) from a CME which left the Sun on the 16th, and a glancing impact is also possible either late day 2 (21st) or early day 3 (22nd) from a CME from the Moderate flare on the 19th. Both of these are low confidence with the bulk of the CME material missing, passing ahead and to the north of Earth. A further slower, and weak CME on the 19th has the potential to arrive day 4 (23rd), but confidence is low on impacts due to the slow CME speed along with background solar winds being forecast to gradually decline to ambient levels by this stage. Geomagnetic activity is Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

forecast to be mostly Quiet to Unsettled with isolated Active intervals possible, but a slight chance of increasing Active to G1/Minor storm levels from any CME arrivals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to slowly decrease back below the S1/Minor solar radiation storm level, most likely later on day 1, with a gradual return to background levels through the next four days..

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	20	10	20	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	20	20	10	5
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	Yes	100	10	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)